In this IoT project, I have shown how to make an IoT-based Smart Home with Arduino IoT Cloud & Alexa using NodeMCU ESP8266 to control 4 home appliances with voice commands

If the internet is not available, then you can control the home appliances manually with switches. During the article, I have shown all the steps to make this smart home system.

This IoT-based Home Automation system has the following features:

- Control appliances with Alexa and Arduino IoT Cloud Dashboard
- Control appliances manually with switches.
- Control home appliances manually without internet.
- All resources used for this project are FREE.

So, you can easily make this home automation project at home just by using a NodeMCU and relay module. Or you can also use a custom-designed PCB for this project.

- Node MCU board
- 4-channel SPDT 5V Relay Module
- Push Buttons
- Alexa Echo Dot (Optional)

Circuit Diagram of the NodeMCU Home Automation Project

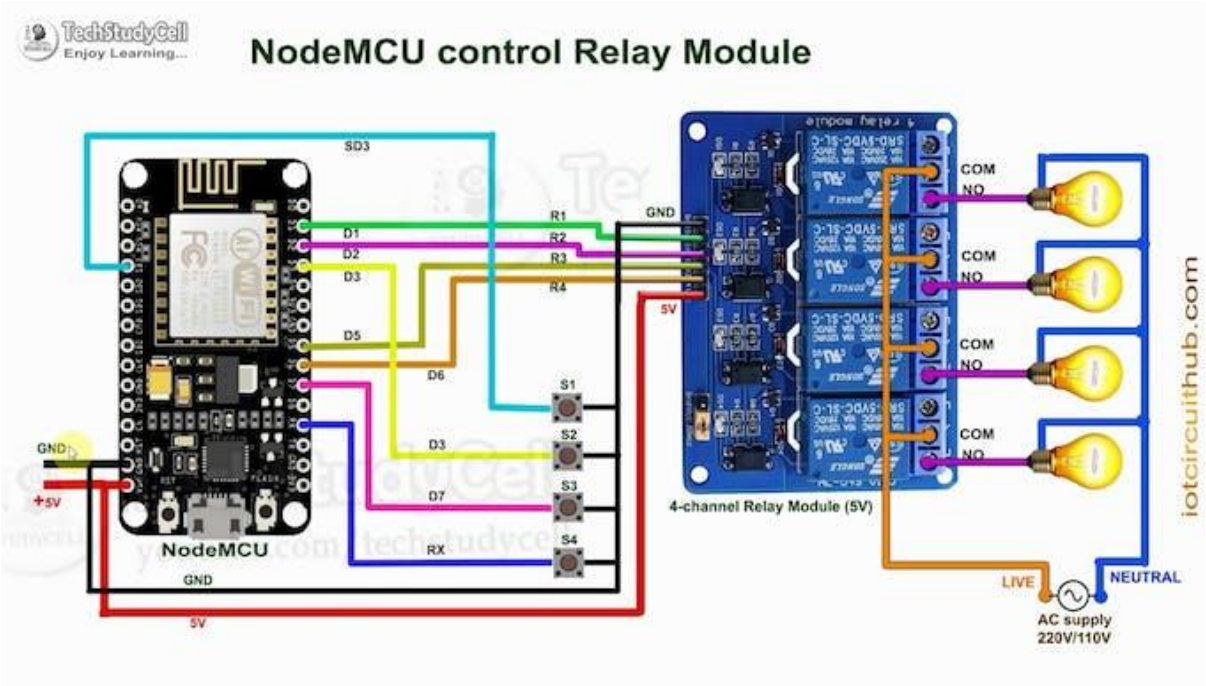
This is the complete circuit diagram for this home automation project. I have explained the circuit in the tutorial video.

The circuit is very simple, I have used the GPIO pins D1, D2, D5 & D6 to control the 4 relays.

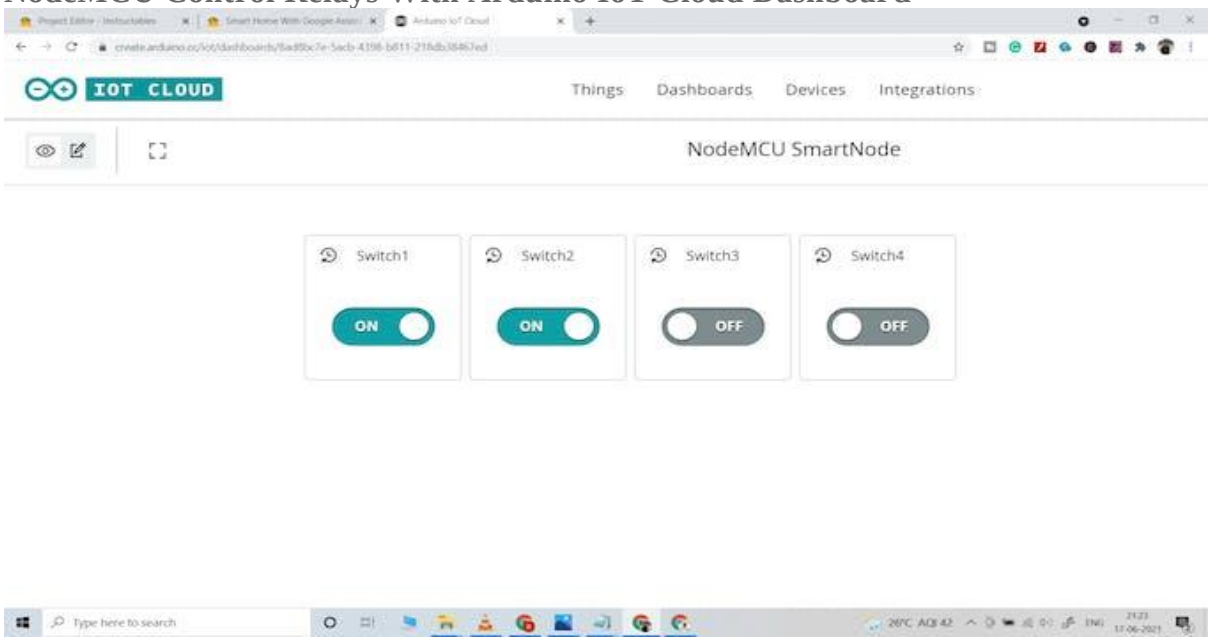
And the GPIO pins SD3, D3, D7 & RX connected with push buttons to control the 4 relays manually.
I have used the INPUT_PULLUP function in Arduino IDE instead of using the pull-up resistors.

I have used a 5V mobile charger to supply the smart relay module.

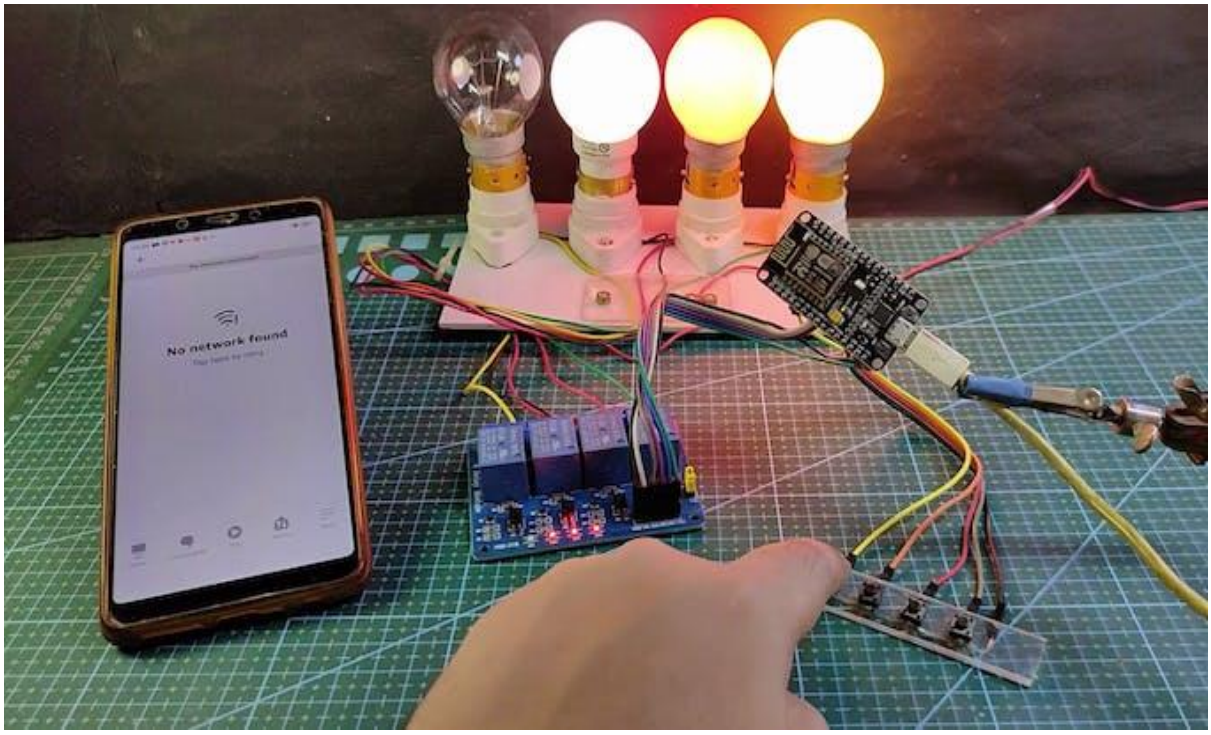
Here, the D3 pin should not be connected with GND during the booting process of NodeMCU.



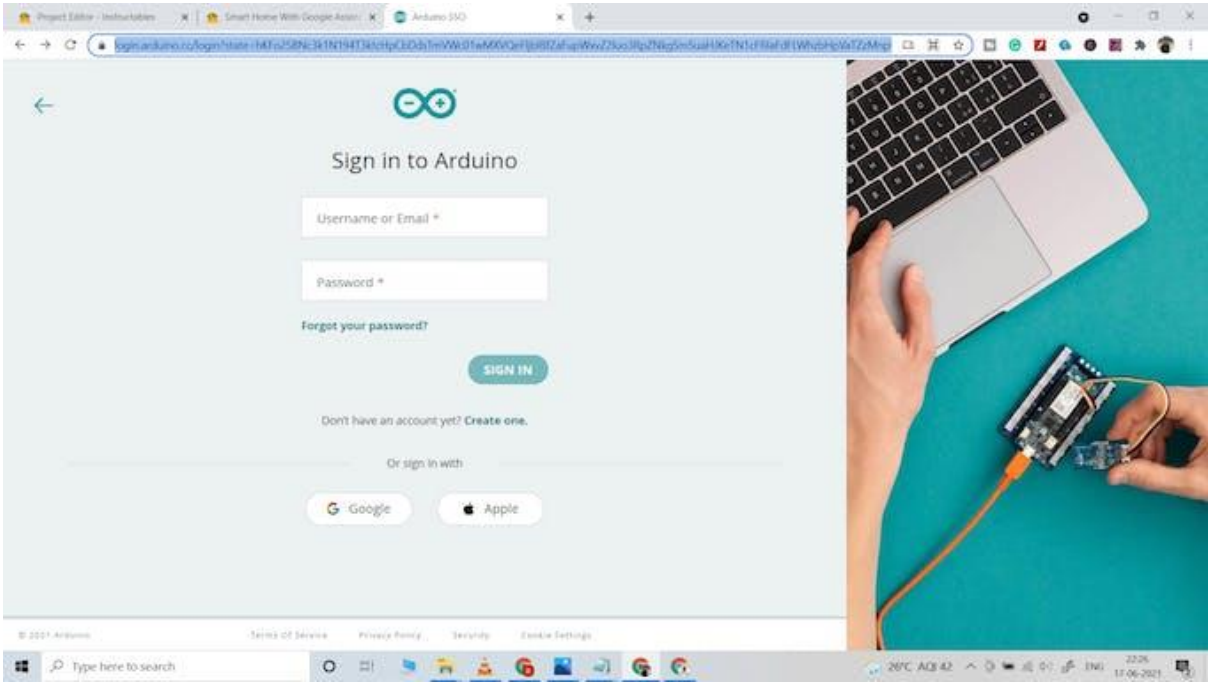
NodeMCU Control Relays With Arduino IoT Cloud Dashboard



Control Relays Manually From Push Buttons

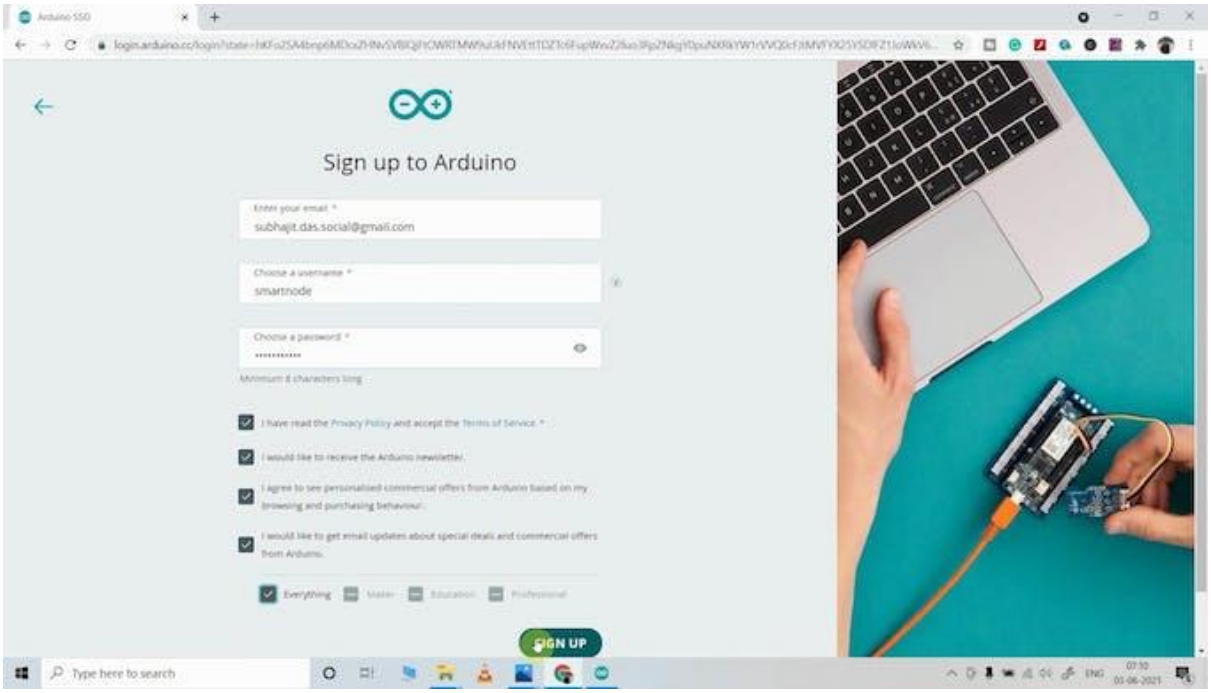


Create Arduino IoT Cloud FREE Account

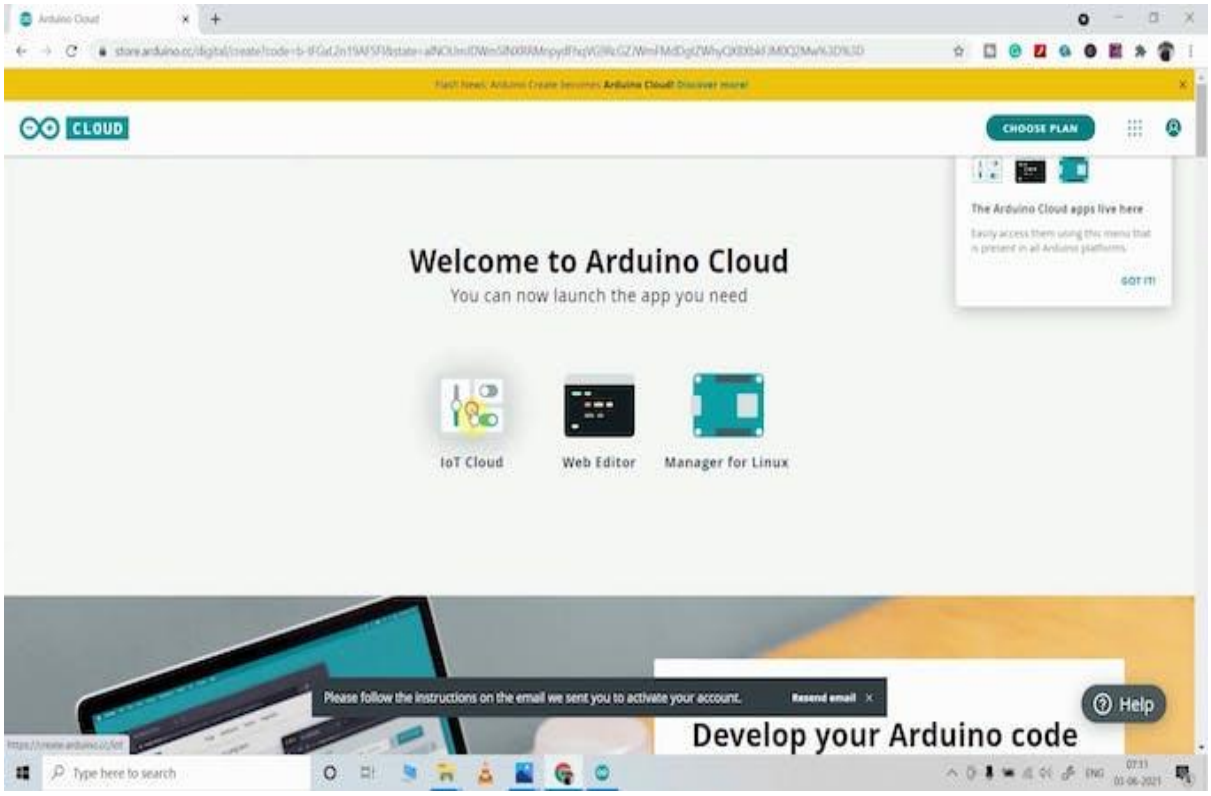


- Click on "Create one".

- Enter your birthday, then click on "Next".

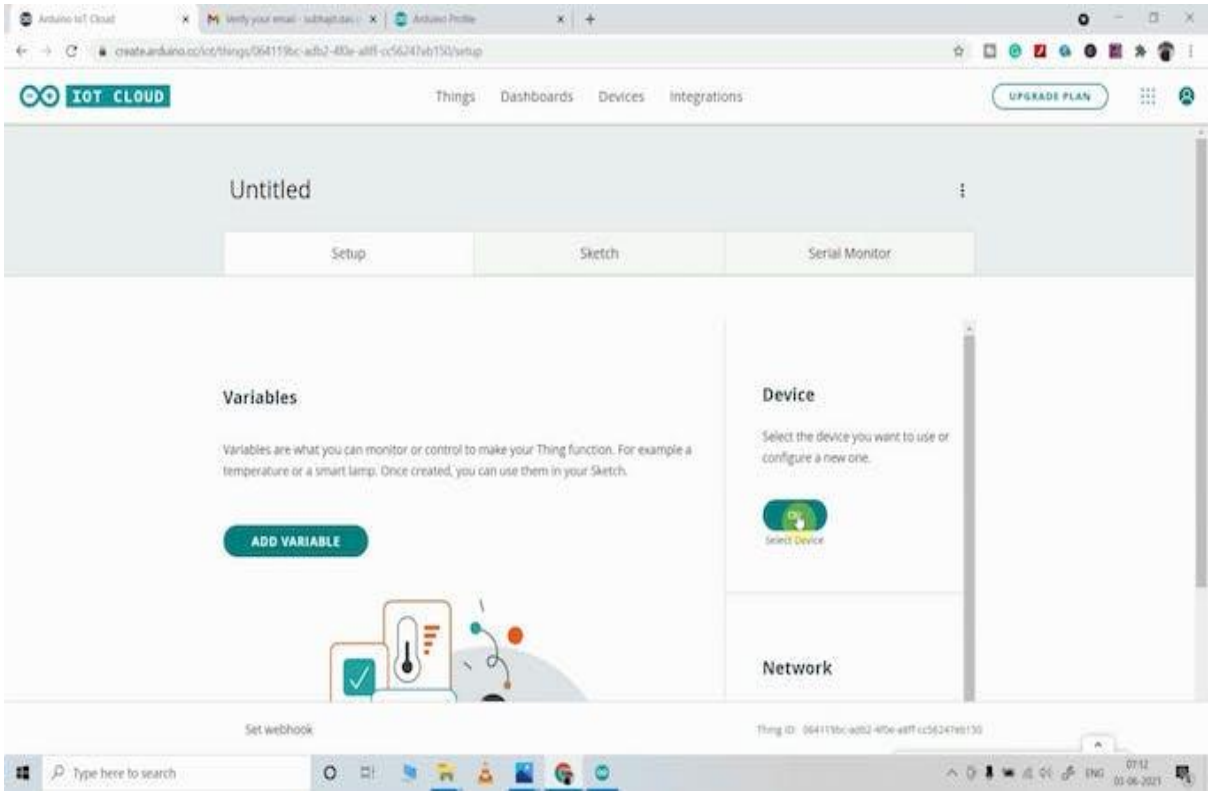


- Enter the email ID, user name, set password. Then click on "Sign Up".

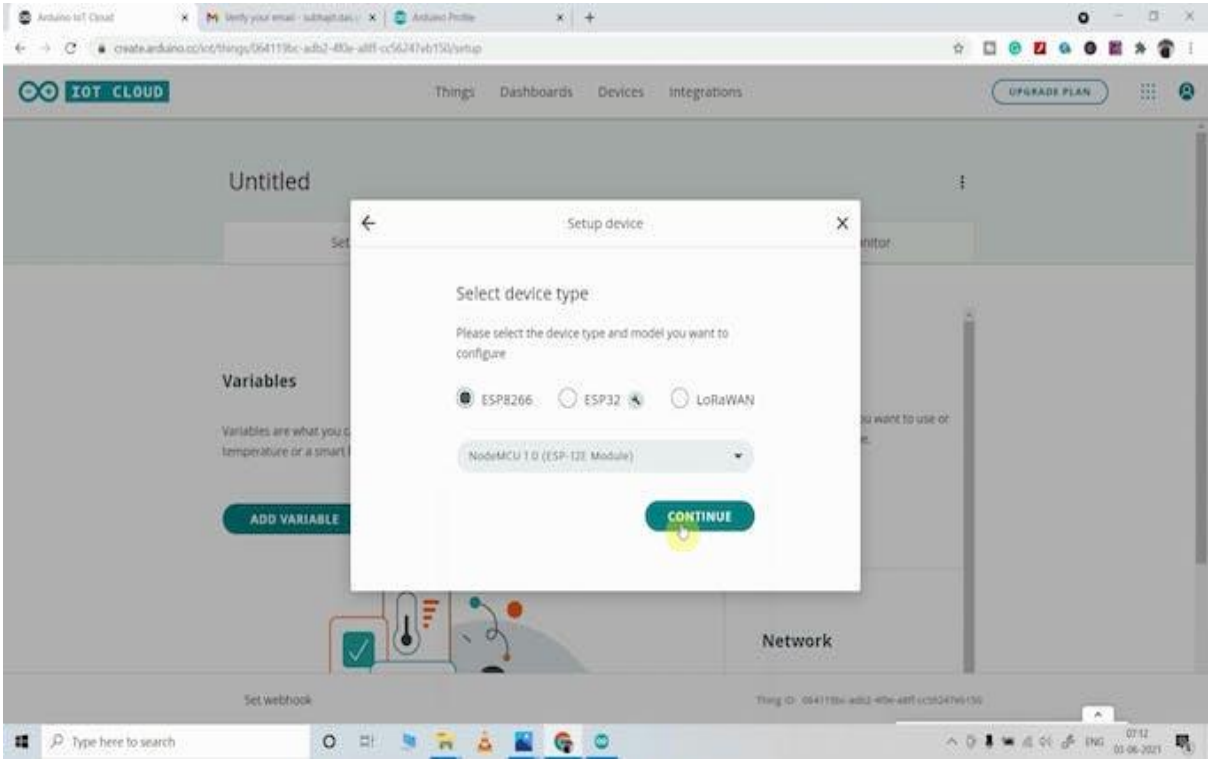


- Now click on "IoT Cloud".

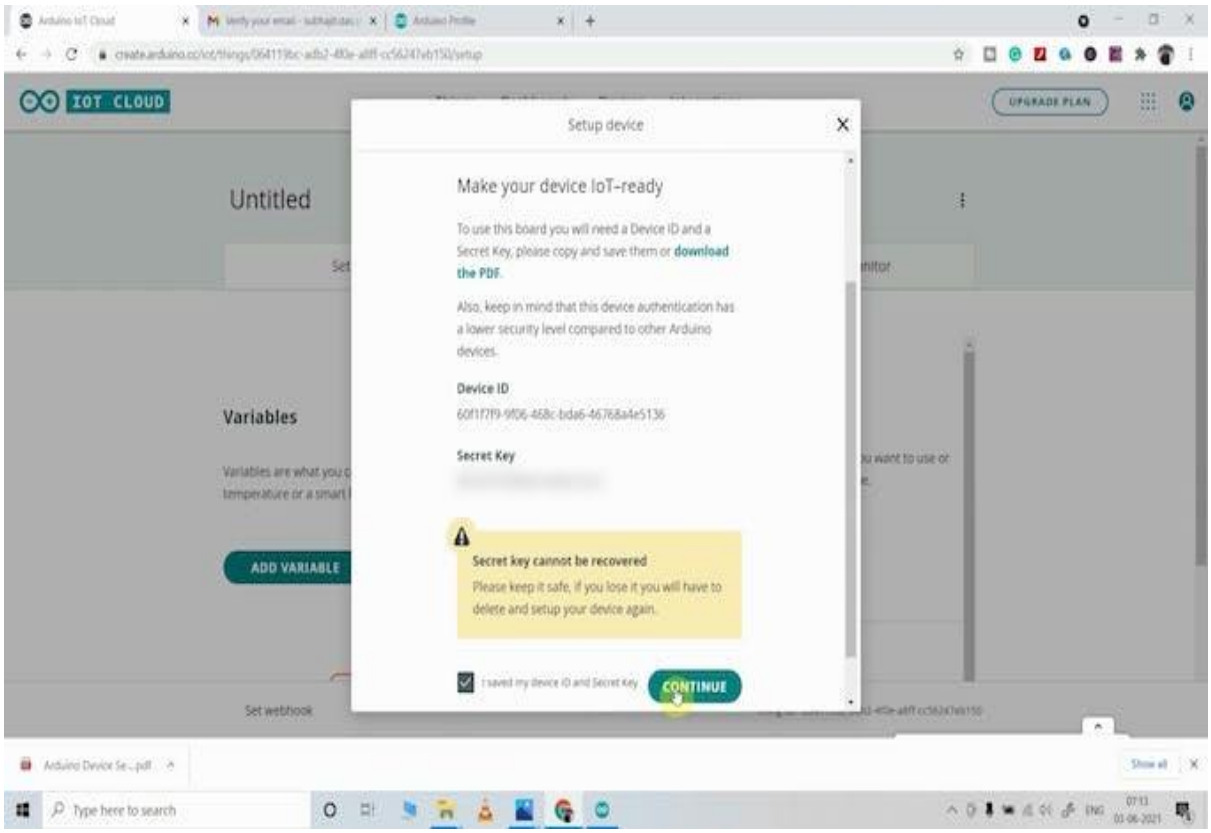
Add NodeMCU ESP8266 Device in the Arduino IoT Cloud



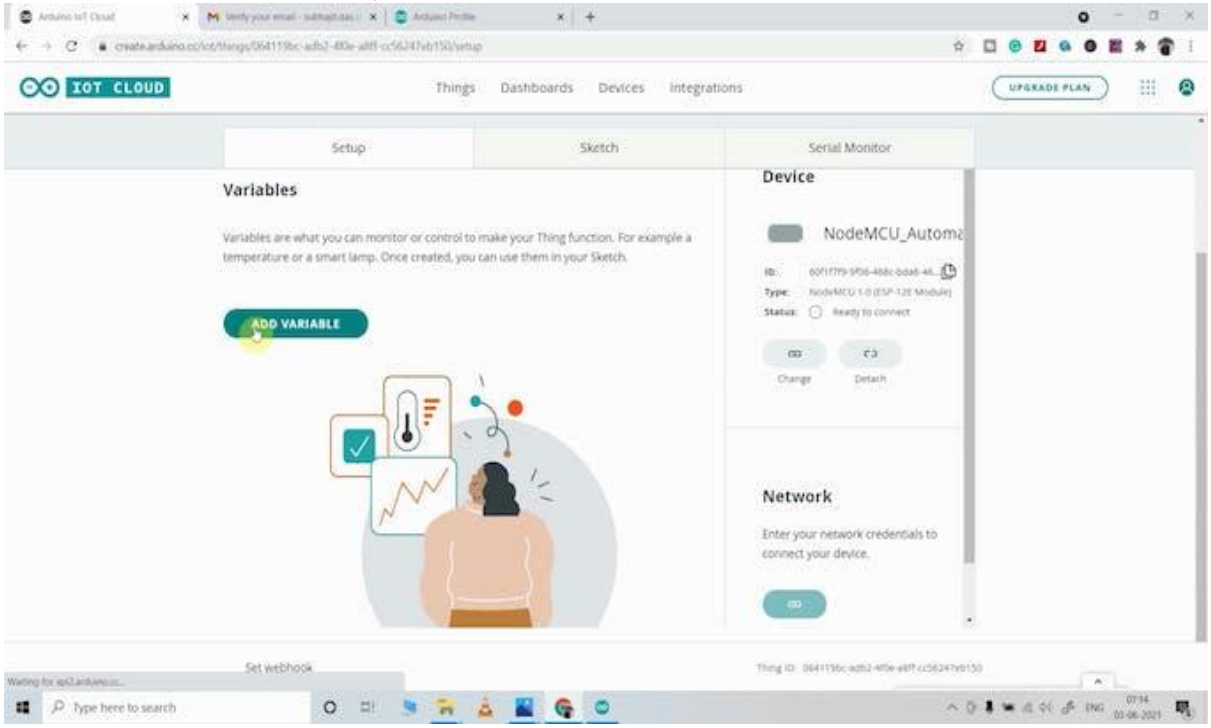
Click on the Select Device on the right side



- Select "Set up a third Party device", then select device type as ESP8266 and device model as NodeMCU 1.0.



- You will get a Device ID and Secret Key which will be required in the code.
- Click on "Continue", You will find the device added.

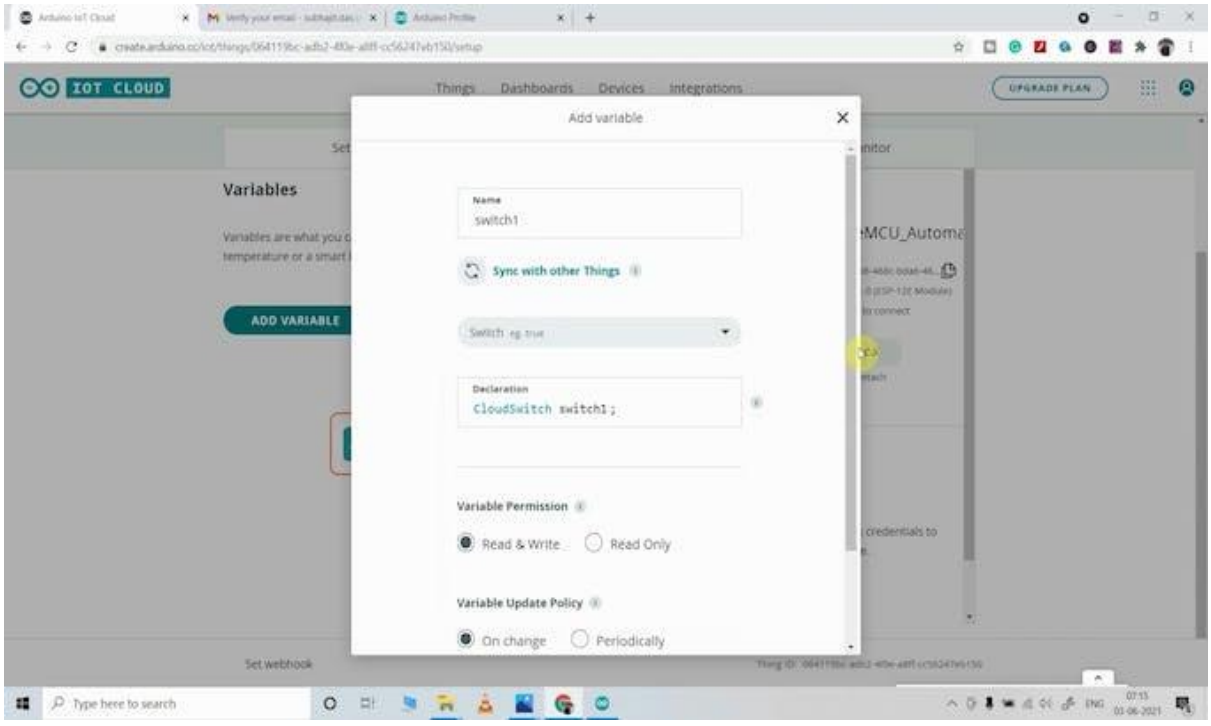


You can see, the device added.

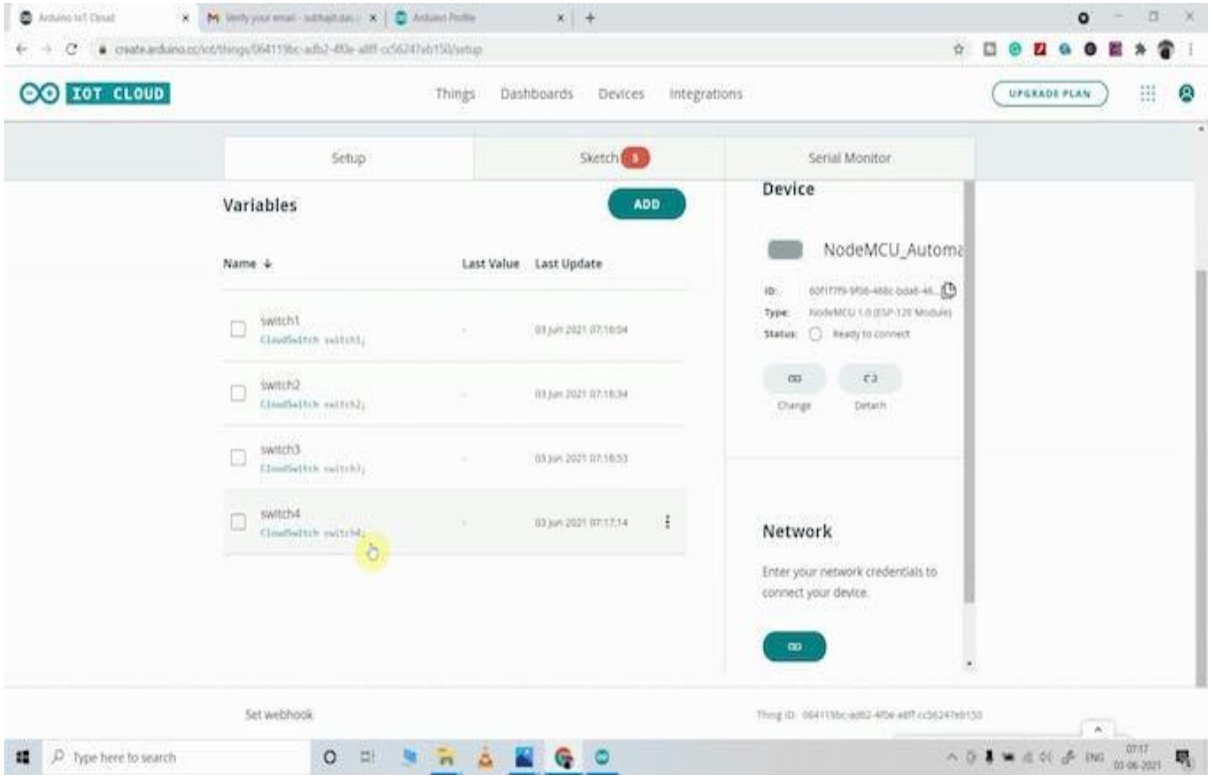
Add Variable in Arduino IoT Cloud

Now to control 4 relays, you have to add 4 variables.

Click on the "ADD VARIABLE" button.

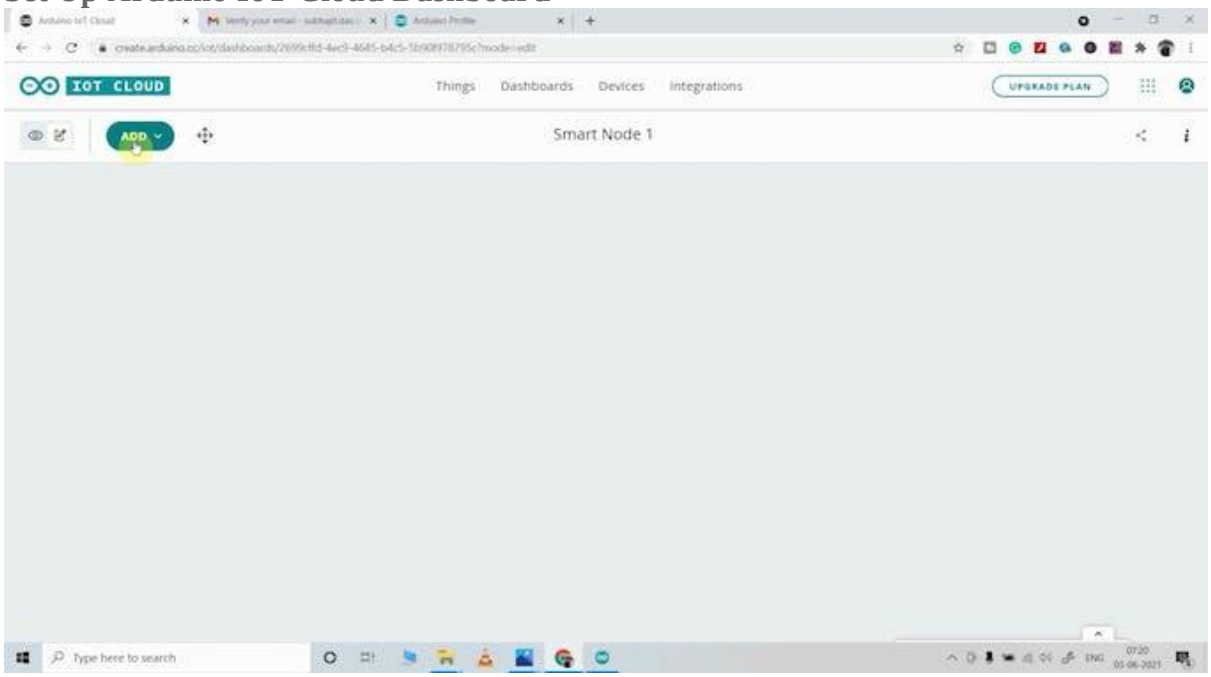


Enter name, then select Alexa compatible switch type. Variable Permission will be "Read & Write" and Variable Update Policy will be "On Change"

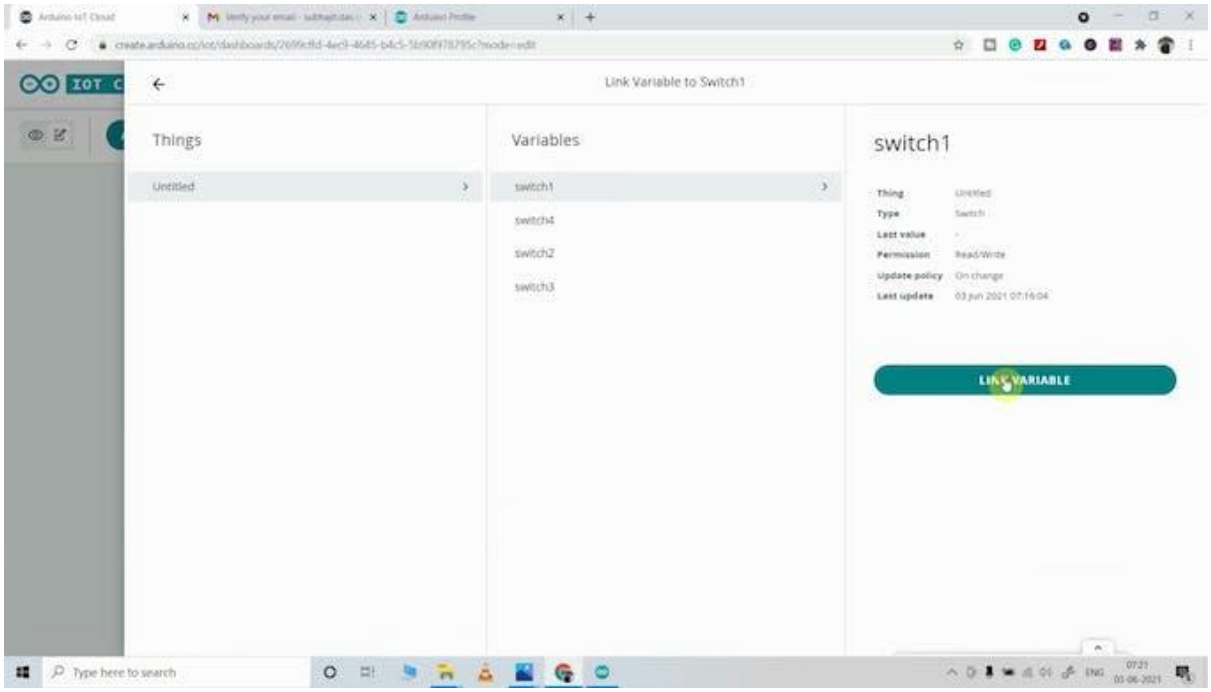


In a similar way, you have to add the next 3 variables.

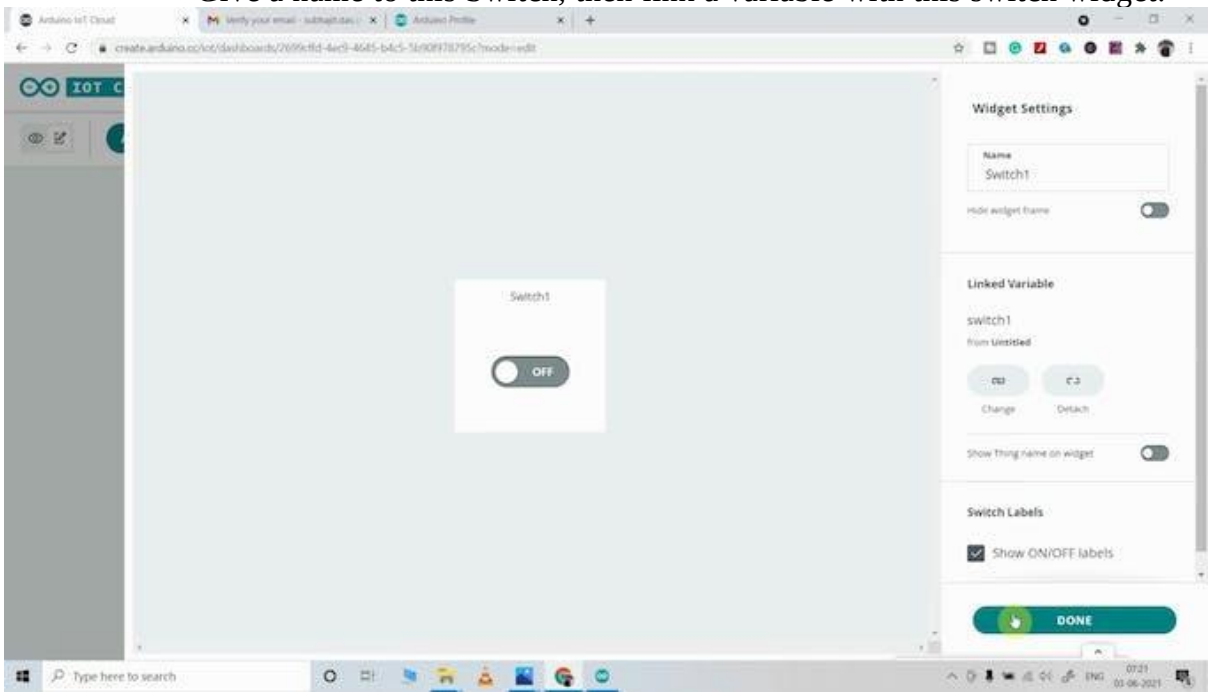
Set Up Arduino IoT Cloud Dashboard



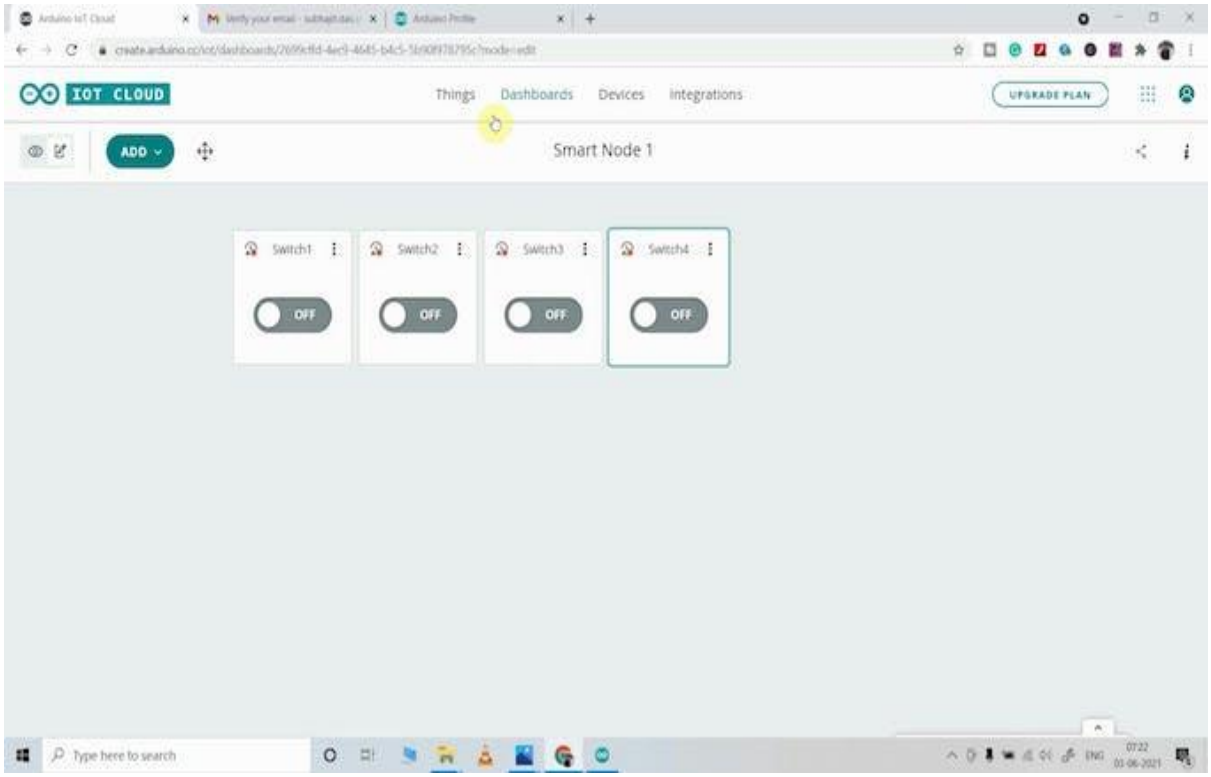
- Now click on Dashboard on the top to set up the Arduino cloud dashboard.
- Then click on Build Dashboard.
- After that click on the EDIT icon. Then click on ADD and select Switch.



- Give a name to this Switch, then link a variable with this switch widget.

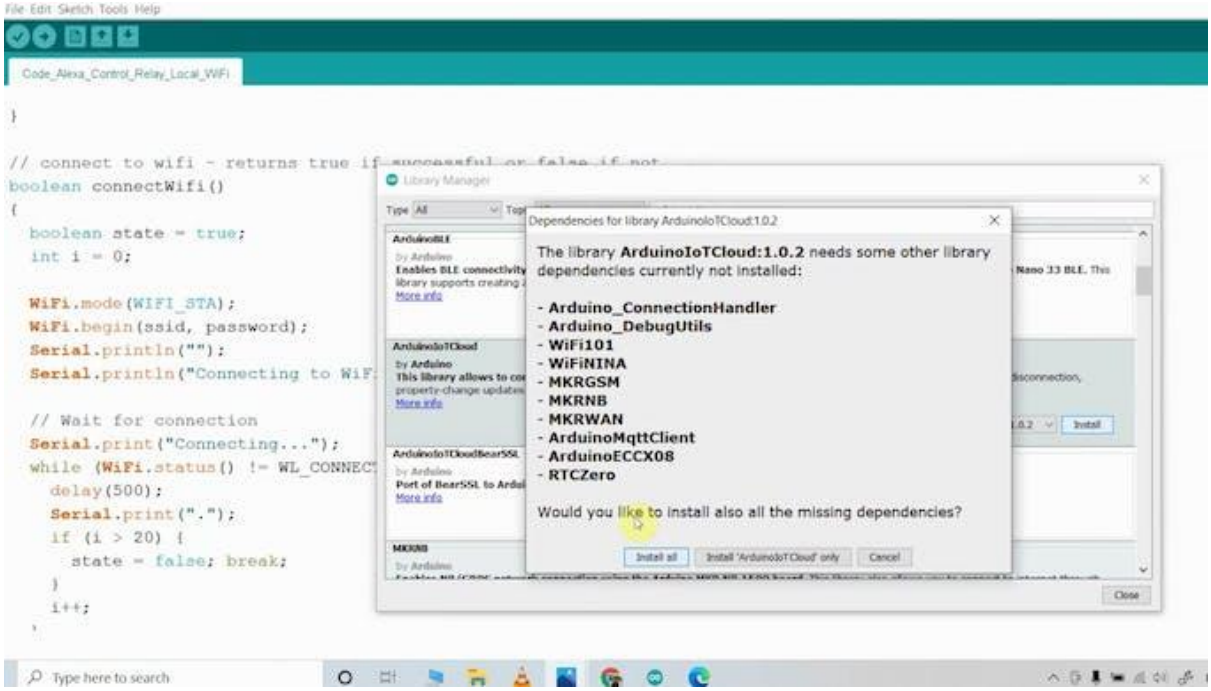


- Then click on Done.



In a similar way, you have to add total 4 Switch widgets to control 4 relays.

Program the NodeMCU ESP8266



In the folder you will get 3 files (1.ino file & 2.h files). Keep all the files in the same folder. Now open the.ino file with Arduino IDE.

First, you have to install the ArduinoIoTCloud library. During installation, it may ask to install other dependencies. Then click on Install All.

In the code, you have to update the THING ID and DEVICE ID in the thingProperties.h file.

```
const char THING_ID[]= "THING ID"; //Enter THING ID
const char DEVICE_LOGIN_NAME[]  = "DEVICE ID"; //Enter DEVICE ID
```

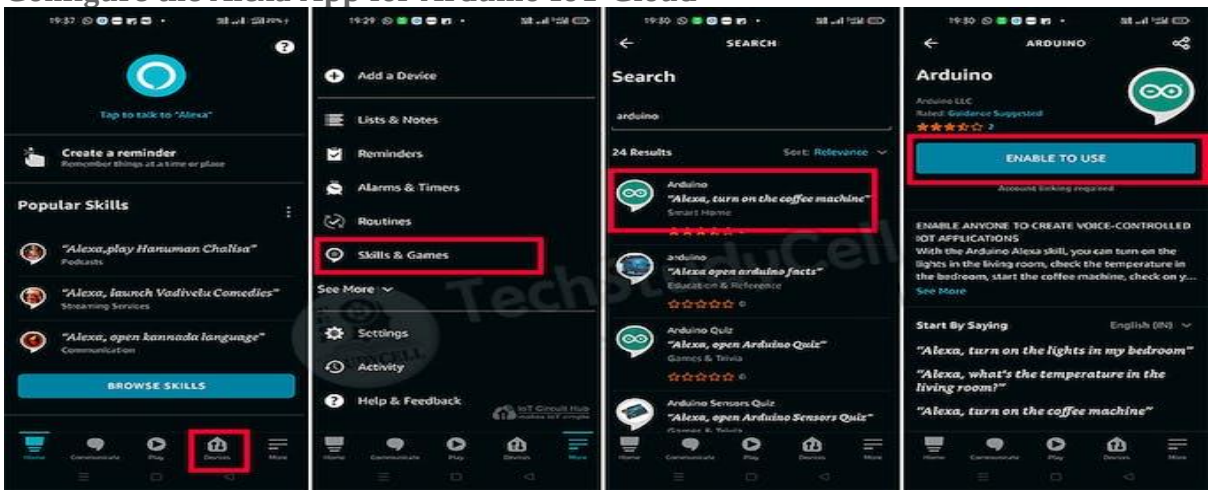
Then update the Wi-Fi credentials and Secret Key in the arduino_secrets.h file.

```
#define SECRET_SSID "WIFI NAME" //Enter WIFI NAME
#define SECRET_PASS "WIFI PASSWORD" //Enter WIFI PASSWORD
#define SECRET_DEVICE_KEY "SECRET KEY" //Enter Secret Key
```

You will get the DEVICE ID and THING ID in the Arduino IoT cloud account. And Secret Key from the PDF which you have downloaded during adding the device in Arduino IoT cloud.

After doing all these changes, you can upload the code to NodeMCU.

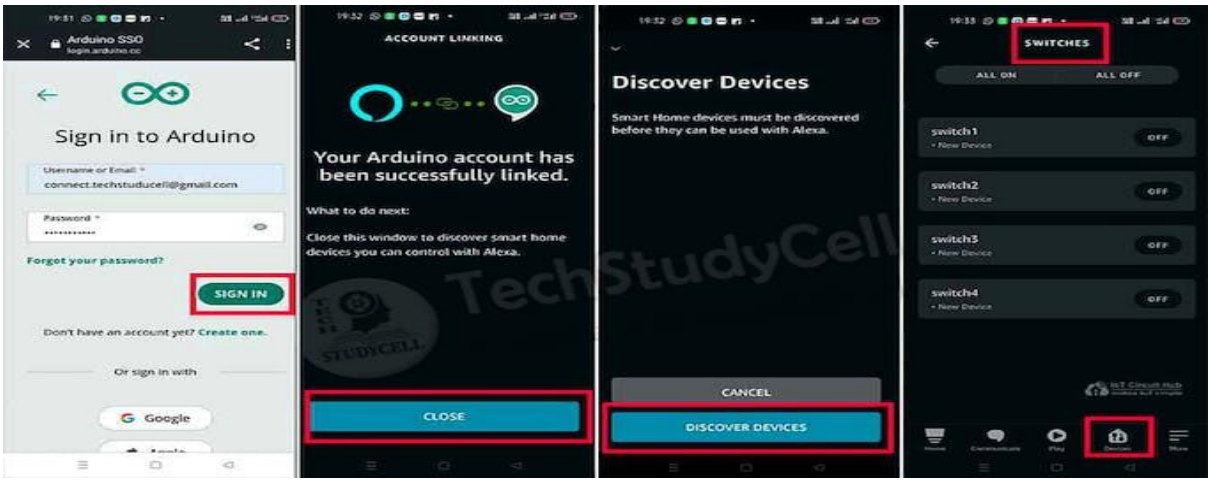
Configure the Alexa App for Arduino IoT Cloud



Download and install the Amazon Alexa App from the Google play store or App Store.

- Tap on "More".
- Then select "Skills & Games".
- Search for Arduino and tap on "Arduino".
- Tap on "ENABLE TO USE".

Connecting Arduino Cloud Devices With Alexa

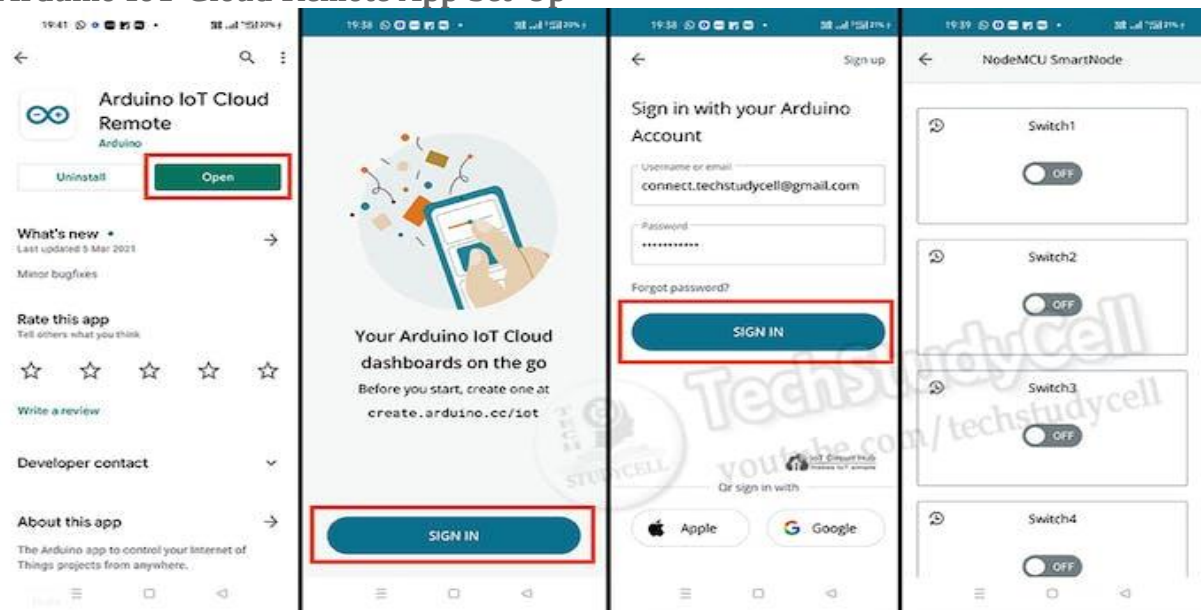


Log in with the Arduino Cloud credentials.

- Tap on CLOSE.
- Tap on "DISCOVER DEVICES". It will take a minute to add devices. During this time the NodeMCU should be connected with the WiFi.
- Tap on "Devices", and tap on "Switches" to see all the devices.

Thus, all the devices from Arduino IoT Cloud will be added to Amazon Alexa App.

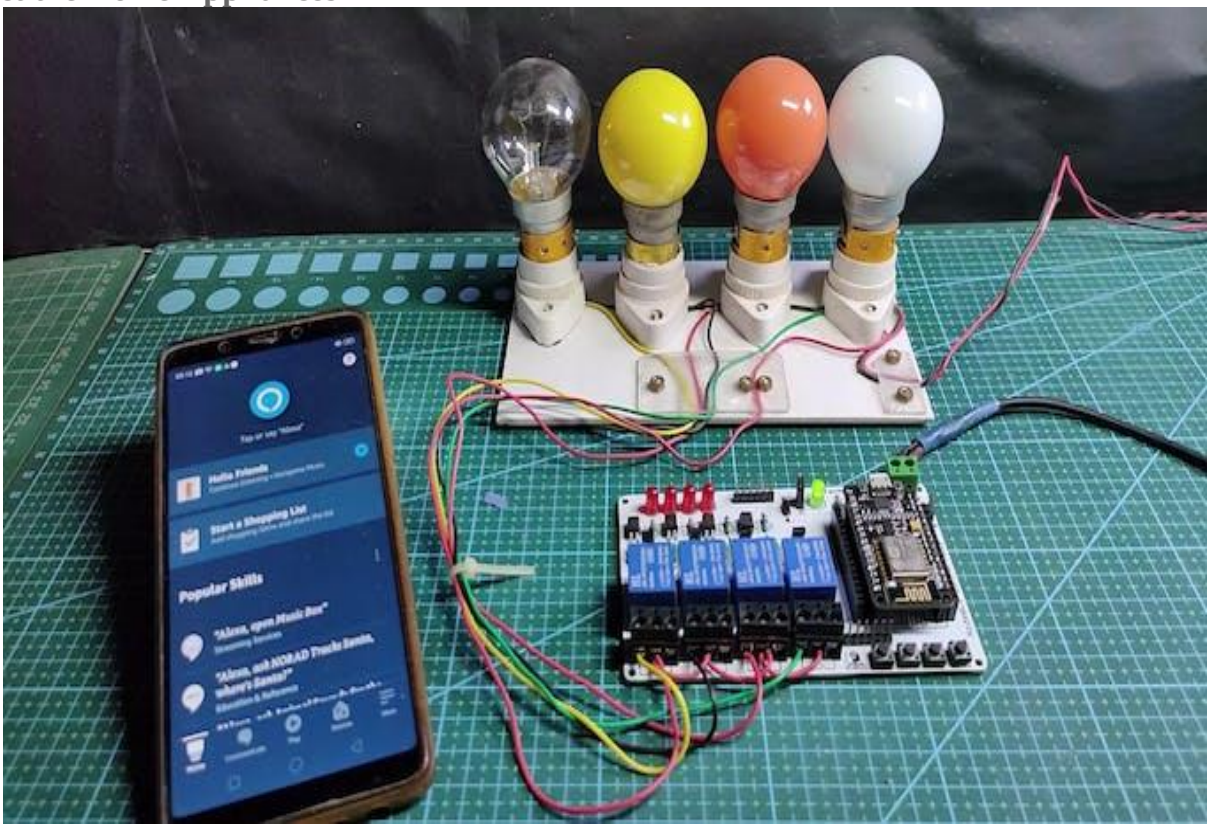
Arduino IoT Cloud Remote App Set-Up



You can also control the appliances from the Arduino IoT Cloud Remote App.

- Download and install the Arduino IoT Cloud Remote App from the Google play store or App Store.
- Tap on SIGN IN
- Then log in to the Arduino IoT Cloud account
- Tap on the THING you have created to open the dashboard.

Connect the Home Appliances



Please take proper safety precautions while working with high voltage.

Connect 5-volt DC supply with the PCB. (I have used my old mobile charger 5V 2Amp)

Turn on the 110V/230V supply and 5V DC supply.

Code:

arduino_secrets_h.ino

sketch_of_arduino_iot_cloud_esp8266_cont

thingproperties_h.ino